DETAILED ACTION

Response to Arguments

Applicant's arguments filed 01/18/2011 have been fully considered but they are not persuasive. The applicant's arguments and Rule 1.132 declaration have been considered, however, the toners presented in the declaration are not found to be commensurate to the toners of Matsunaga. The applicant has employed the use of hybrid polymers as the binder resins of the toners tested in the declaration comprising a polyester segment and a vinyl segment, however, Matsunaga nowhere teaches the use of hybrid polymers. The applicant states in the declaration that reproducing the polymers of Matsunaga would require large amounts of cost and time, however, the applicant teaches the synthesis of several polyester resins that are sufficiently similar to those of Matsunaga in the examples cited in the instant specification. Therefore, it is not clear why the applicant opted to employ hybrid resins instead of polyester resins. The applicant stated in the declaration that the hybrid resin makes it easier to satisfy the requirements of the present claims citing a comparison with magnetic toner 7 of the instant specification. However, from studying Table 6 of the applicant's specification it is not clear that the hybrid resin does contribute any additional propensity to satisfy the limitations of the applicant's instant claims that is lacking in the polyester resin. Furthermore, the applicant has argued in the declaration that the toners described therein did not make a symmetrical form about the glass-transition temperature. However, according to the applicant's claims, the tan delta curve is only required to be symmetrical about the glass transition point (Tg) in the range between Tg-10 °C and

Tg+10 °C, as recited in pending claim 1. The table presented by the applicant in the declaration filed 07/28/2011 shows that Toner A satisfies the applicant's formula (1) of pending claim 1 and therefore is understood to be symmetrical about the glass transition point (Tg) in the range between Tg-10 °C and Tg+10 °C. Since the purpose of the applicant's declaration is understood to be to show that the toners of Matsunaga can not satisfy the applicant's formula (1) on account of the magnetic materials dispersed therein, this argument is not persuasive in light of the evidence presented in the applicant's declaration.

Furthermore, the applicant argues that the true specific gravity and saturation magnetization would not be within the parameters taught by the applicant in pending claim 1 on account of the magnetic material content of the toner of Matsunaga. However, Matsunaga teaches a range of suitable saturation magnetization that encompasses the applicant's range. Furthermore, the examiner has cited Sawada for teaching known benefits of employing toner particles with a specific gravity in the range of from 1.35 to 1.6 g/cm^3. Additionally, the toner of Sawada is taught to comprise metal materials, like the toner of Matsunaga, while still possessing a specific gravity within this range. The applicant has not addressed the examiner's argument that it would have been obvious to any person of ordinary skill in the art at the time of the invention to have followed the guidance of Sawada and imparted the toners of Matsunaga with a specific gravity within the range taught by Sawada. Additionally, from the table presented by the applicant in the declaration, it appears that toners with magnetic materials in amounts between the 90 parts per mass employed in Toner A and 30 parts by mass employed in

Toner B will have true specific gravity, saturated magnetization and values of the applicant's formula (1) within the ranges recited by the applicant in pending claim 1. This is deduced because Toner A, with 90 parts magnetic material has a high true specific gravity (1.8 g/cm^3, just above the applicant's range), a high saturated magnetization (39 Am2/kg, just above the applicant's range) and an inventive value for formula 1 (0.07, within the applicant's range). On the other hand, Toner B, with a much lower amount of magnetic material (30 parts by mass) has an inventive true specific gravity (1.44 g/cm^3), an inventive saturated magnetization (20 Am2/kg) and a value of formula 1 just outside the applicant's range (0.27). Clearly the applicant's data shows that high levels of magnetic materials (90 parts) correlates to high true specific gravity valeus and high saturated magnetization values as both of those values are lowered considerably in toner B comprising 30 pats of magnetic materials. As Matsunaga teaches a range which encompasses toners with between 30 and 90 parts by mass of magnetic material, the applicant's declaration is not persuasive for overcoming the pending rejections.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3 and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2002-341598 (equivalent to Matsunaga *et al.* US PGP 2003/0044708) in view of Sawada *et al.* (US PGP 2003/0039909) and considered with JP 06-118700.

Matsunaga *et al.* is a US equivalent document of JP 2002-341598 and will be cited in this rejection for clarity. Matsunaga teaches a toner comprising a binder resin, a colorant, a wax, and an inorganic fine powder (Abstract). Said toner also comprises a magnetic material having an average particle size of from 0.1 to 0.5 micrometers and a saturated magnetization of 10-200 Am^2/kg in a magnetic field of 796 kA/m (p. 7 [0095]). Said magnetic material is taught to show a good affinity with a binder resin, improve the dispersion of a charge control agent, and is well dispersed in the binder resin resulting in improved uniformity and stability of chargeability in the toner (p. 7 [0092]). Additionally, Matsunaga teaches that the toners have from 55 to 95% by number of particles having a circularity of 0.950 or more (p. 8 [0098]). If the number of particles having this circularity is outside the stated range the toner is liable to suffer from charging failure (p. 8 [0100]). Furthermore, in order to ensure uniform chargeability, the toner is taught to have a particle diameter of from 4 to 12 micrometers (p. 8 [0101]). Matsunaga teaches a mixture of high and low molecular weight binder resins in the toners disclosed in the inventive examples. Both polyester and vinyl binder resins are prepared having low and high molecular weights. Production example 6 discloses a vinyl monomer (VL-2) having a molecular weight of 6400 (p. 17 [0253]) and production example 12 discloses a binder resin (B-2) comprising 75 parts by weight of VL-2 and 25 parts by weight of high molecular weight vinyl polymer VH-2 (p. 17 [0261]). Example 21

discloses a toner (21) comprised of 105 wt. parts of binder resin B-2 out of a total of 198 total wt. parts (p. 17 [0265] and p. 18 [0281]). Therefore, 38% of toner (21) is the low molecular weight polymer (75 pt. Weight/198 pt. Weight = .38 x 100% = 38%). Furthermore, the two polymers that comprise binder resin B-2 are resins VL-2 and VH-2. VL-2 has a glass transition temperature of 60 C (p. 17 [0253]) and VH-2 has a glass transition temperature of 57 C (p. 17 [0257]) and therefore the two polymers have different softening points.

Matsunaga teaches that the toner have a dielectric loss tangent in the range of .025 to .08 in a temperature range of 100 to 130 °C. This is outside the range recited in pending claim 3 of the present application. Furthermore, Matsunaga does not teach that the dielectric loss tangent have the relationship of the applicant's formula (1) in pending claim 1. JP 06-118700 (henceforth JP ‘700) teaches a magnetic toner comprising a binder resin ([0014]), a colorant ([0017]), and a magnetic material ([0022]). JP ‘700 teaches that as a toner is heated to and beyond it’s glass transition temperature, the peak dielectric loss tangent will coincide with the glass transition temperature of the toner. Drawing 1 of JP '700 shows that the shape of the peak is symmetrical. Therefore, since the glass transition temperature (Tg) represents the maximum point of a symmetrical peak, it is clear that the toners of JP '700 behave according to the applicant's formula (1) since tandelta values are approximately equal at -10 and +10 degrees from the maximum point (Tg). This relationship can also be extended to the toner of Matsunaga as JP '700 teaches this as a general trend and not a phenomena specific to the toners described in JP '700. Furthermore, JP ‘700 teaches

that a peak value of tandelta in a pyrosphere (the temperature range about the glass transition temperature) tandelta is usually in the range of 0.02 to 0.04 while at an ordinary temperature of 0-25 ℃ tandelta of a toner is usually in the range of 0.001 to 0.01 ([0009-10]). Thus as temperature increases, so does tandelta. Examining drawing 1 of JP '700 clearly shows that tandelta starts off at a baseline value below 0 ℃ and increases with temperature until a maximum tandelta value is reached about the glass transition temperature. Tandelta then decreases at temperatures above the glass transition temperature before finally ramping up rapidly at temperatures above 100 ℃. Matsunaga measured the tandelta values of their toners in this high temperature region of between 100 and 130 ℃ (Abstract). The glass transition temperatures of polymers used for the binder resin are all in the range of 57-62 ℃ and the glass transition temperature of the sulfur containing resin is taught to preferably be from 75 to 95 ℃ ([0039]) and embodiments are disclosed with Tg's ranging from 27-133 ℃ ([0223-0241]). Therefore the glass transition temperature of the toners would be expected to be approximately in the 65-75 ℃ range and could be shifted depending on the sulfur containing resin incorporated in the toner. This glass transition temperature range corresponds to the general range of a typical pyrosphere taught to be 50-75 ℃ by JP ‘700 ([0009]). The toners of Matsunaga would therefore behave in the manner depicted in the graph of drawing 1 of JP ‘700. From drawing 1, it can be seen that as the glass transition temperature of a toner is increased, the graph is shifted horizontally (to the right) and therefore tandelta (post shift) will be lower at temperatures approaching the glass transition temperatures and higher at temperatures above the glass transition

temperature. From this, it is clear that the toners of Matsunaga would have lower tandelta values at 40 °C than at the 100-130 °C at which they were measured. Furthermore, since the glass transition temperatures of the toner vary depending on the Tg of the sulfur containing resin, it is clear that the toners of Matsunaga inherently have tandelta values within the applicants range of .002 to .01. Matsunaga *et al.*, however, do not teach a true specific gravity for their toners.

Sawada *et al.* teach a toner comprising metal materials and possessing a specific gravity in the range of 1.35 to approximately 1.6 g/cm^3 (p. 3 [0028]). Sawada further teaches that by using a toner with a specific gravity within this range the toner can be easily captured in a pulverizing and classifying method resulting in a superior manufacturing method (p. 3 [0028]). Additionally, with toners having a specific gravity below said range manufacture becomes problematic resulting in poor charging and charge stability (p. 3 [0029]). When the specific gravity is above said range, the required weight of the toner necessary for forming a good quality image becomes large and the cost of the toner increases. Additionally, resin concentration becomes lower and the fixing ability of the toner suffers causing the toner to detach from the fixed image (p. 3 [0030]).

Therefore, it would have been obvious to any person of ordinary skill in the art at the time of the invention to have created the toner particles of Matsunaga *et al.* to have a specific gravity within the range of 1.35 to about 1.6 g/cm3 as taught by Sawada *et al.* This would have resulted in improved toner manufacturing procedures as well as enhanced fixing properties and lowered production costs. Manufacturing the toner of

Matsunaga *et al*. with a specific gravity within this range could be easily achieved by adjusting the specific gravity of the metal material used as magnetic additives.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2002-341598 (equivalent to Matsunaga *et al.* US PGP 2003-044708) in view of Sawada *et al.* (US PGP 2003/0039909) and considered with JP 06-118700 as applied to claims 1-4 and 6-7 above, and further in view of Ohtani *et al*. (US Patent 4789613).

The complete discussions of Matsunaga *et al*., Sawada *et al*. and JP '700 above are included here. None of these inventors, however, specifically teach that the toner have a dielectric constant of from 15 to 40 pF/m.

Ohtani *et al*. teach toner comprising a binder resin, a charge control additive, a colorant, and a highly dielectric material having a dielectric constant of at least 10 (Abstract). According to Ohtani, the material having a dielectric constant of at least 10 acts as a capacitor to promote the frictional charge of the toner surface and allows improved retention of the charge on the surface of the toner (Col. 3 ln. 49-54). Furthermore, this effect is not diminished by an increase in humidity prevents charge leakage even if some of the conductive dispersant remains on the toner surface. These properties result in excellent developability and transferability without any sacrifice in image quality (Col. 3 ln. 54-60).

Therefore, it would have been obvious to any person of ordinary skill in the art at the time of the invention to have created the toner particles of Matsunaga *et al*. to have a specific gravity within the range of 1.35 to about 1.6 g/cm^3 as taught by Sawada *et al.*

and to have adjusted the dielectric constant by adding the dielectric material of Ohtani. This would have resulted in a toner that had improved charge retention, improved stability in high humidity environments and excellent developability and transferability without any sacrifice in image quality. Furthermore, these improvements would have improved toner manufacturing procedures as well as enhanced fixing properties and lowered production costs.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PETER VAJDA whose telephone number is (571)272-7150. The examiner can normally be reached on 7:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Peter L Vajda/
Primary Examiner, Art Unit 1721
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